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## ORIGINAL ARTICLES.

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### REPORT OF A CASE OF UNILATERAL FACIAL AND ORBITAL ŒDEMA AND EXOPHTHALMOS, OF NEPHRITIC ORIGIN.

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BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO.

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Mr. O. M., aged 22, consulted me July 2. The left lids were enormously swollen and œdematous, so that I could not open them; also, this side of the face, extending as far as the median line of the nose on the inner side and on a level with the upper teeth below and to the left ear posteriorly. There was no redness of face; the swelling pitted on pressure; no discharge from eye. Ophthalmoscopic examination of R. E.: Disc hazy, veins considerably enlarged, arteries somewhat smaller than normal. Examination of urine by picric acid test shows sugar. Roberts' test shows ten grains of sugar to the ounce. I gave him ten grains of potassium acetate every two hours. July 3: The swelling is greatly reduced so that he can hold the lids partly open. The conjunctiva shows marked chemosis; the cornea is normal. To-day the parotid

and sublingual glands in the left side are very much enlarged. I ordered him to continue the potassium acetate, also to take one-eighth grain of pilocarpine muriate morning and evening; also seven grains of potassium iodide *ter die*, and mercurial inunctions morning and evening. Atropine was instilled every three hours. July 3. Ophthalmoscopic examination L. E. has neuritis optica. Disc hazy, its outer half shows slight atrophic cupping and is too pale. The veins greatly enlarged, the arteries fine. He has considerable exophthalmos. L. E., T. + 1. R. E., Tn. The pupil dilates normally to atropia. July 4: The œdema of the face has disappeared. He still has some exophthalmos and chemosis (the conjunctiva has not been red). He is to stop the pilocarpine, but to continue the other medicines. Remote vision, R. E., normal; L. E. =  $\frac{1}{7}$ . No goitre.

HISTORY.—The patient says that for about ten days before the eye became swollen, he had pain in the small of his back. His work in a livery stable—washing buggies—constantly exposed him to being wet. He never had scarlet fever; an aunt of his died of cancer, but no other relative has had this disease; there was no tuberculosis or scrofulosis in the family; he says, he had syphilis two years ago, but has not had it since (?). He first noticed the swelling of the eye on the morning of July 2; and the previous night he had washed a buggy.

July 14. Vision, R. E. =  $\frac{1}{14}$ ; L. E. =  $\frac{1}{14}$ . No exophthalmos nor œdema. Ophthalmoscopic examination, R. E., retina clear, disc slightly hazy, due to papillitis. Arteries normal, veins enlarged both on the disc and in the stroma retinae. The disc is too pale and slightly cupped externally. L. E., hazy on inner half from papillitis, outer half too pale and shows atrophic cupping. Retina normal. Arteries normal, veins enlarged. He looks very anæmic. I ordered him to stop diuretics and diaphoretics but to continue the mercury and potassium iodide. I also gave him a tonic of iron, quinine and strychnia.

## REMARKS.

After a careful examination of a large amount of ophthalmic literature, I fail to find any case exactly similar to this. We know that exophthalmos and orbital œdema may be caused either by tumors or growths pressing on the ophthalmic vein within the orbit;<sup>1</sup> periostitis about the sphenoidal fissure; thrombosis of ophthalmic vein;<sup>2</sup> gumma pressing on ophthalmic vein within cranium; destruction of sympathetic leading from ganglion of Gasser; aneurism of ophthalmic artery; aneurism of ophthalmic vein;<sup>3</sup> exophthalmic goitre; varicosity of orbital veins;<sup>4</sup> stings of venomous insects; injuries; liver and kidney disease.<sup>5</sup> The rapid diminution of the œdema under the active diuretic and diaphoretic treatment and the absence of any history of insect sting, prove, that this case was one of orbital and facial œdema caused by a transient attack of acute nephritis in a diabetic and syphilitic patient. The œdema of the lids and face had almost disappeared before any anti-syphilitic treatment was given. Just why dropsy should have appeared at this point and not appeared in any other part, I cannot determine. We know that when the kidneys are congested, the engorged venous system frequently relieves itself by effusion into serous cavities, because there is less resistance at these points. The orbit being filled with loose cellular tissues and fat, offers less resistance than the unyielding substance of the brain and hence the predilection of dropsy for this part.

<sup>1</sup>Schweigger's Handbook of Ophthalmology.

<sup>2</sup>See case reported by K. J. McKay in Transactions American Ophthalmological Society, 1882.

<sup>3</sup>Galezowski.

<sup>4</sup>Schweigger.

<sup>5</sup>Diseases of the Eye, H. Walton.

## SOCIETY PROCEEDINGS.

### AMERICAN OPHTHALMOLOGICAL SOCIETY.

MAY 1894 AT WASHINGTON, D. C.

[CONCLUDED.]

*"The Decreasing Percentage of Myopic Eyes—Through the Optical Correction and Treatment of Ametropia."*

DR. S. D. RISLEY, of Philadelphia, presented in abstract the results of a statistical investigation of the correction of ametropia in all asthenopic eyes applying for relief to himself and colleagues in Philadelphia for twenty years, during which time it had been the almost uniform custom to correct all asthenopic ametropic eyes. He argued that if the claim he had made in 1881, in the deductions from the results of the examination of the school childrens eyes in Philadelphia, viz., that the strain made necessary by the congenital anomalies of refraction, particularly astigmatism, was the essential cause of the pathological states underlying the myopic eye, were true, then the uniform correction of these anomalies in all asthenopic eyes in the community applying for relief, would manifest beneficial results in the diminution of both the percentage of myopic eyes and in the grade of myopia found after twenty years of such optical corrections. A careful analysis was made of all the cases of ametropia seen in his own practice since January 1, 1874, and of all distance glasses furnished on the prescriptions of ophthalmic surgeons, by two large optical companies for the same period. The cases of myopia were grouped according to grade of myopia found as shown by the correcting glasses, astigmatism being carefully noted in every case. The twenty years covered by the investigation were then divided into periods. The results were based upon approximately 200,000 eyes. In the private work, where the patients were drawn from the more studious portions of the population, and where the corrections were all made under mydriatics there was found 22. % of myopic refraction, 90.33 % of

the myopic eyes being astigmatic. In the optician's books, where many were the records of hospital work and doubtless many of the formulæ represented manifest corrections, only 21.6% were for myopic refraction, and of those 60.% were astigmatic. In the first period of years there was found in the private case books 28.43% of myopic refraction which steadily fell through the succeeding periods to 16.78% in the last period. The fall was from 25.40% to 15.2% in the optician's books. Of equal interest were the findings as to the grade of myopia. M. of 10. D or greater had fallen approximately 50.%, i. e., in the number of patients with M. higher than 10.D. A nearly similar fall was noted in the intermediate grades, but in M. of less than 1. D. the percentage increased. The explanation being that under the treatment and optical correction of ametropic eyes with commencing M., the further progress of the malady had been arrested. A fact which accounted for the great decrease in the number of high grade myopes. The correction of the asthenopic eyes with ametropia, particularly with astigmatism, had prevented the commencement of the myopic distention of the ball, hence the gradually decreasing percentage of M. in the community. It was claimed that observation of individual cases had shown that the myopic eyes were, in many cases certainly, recruited from the hypermetropic eyes through the turnstile of astigmatism, never becoming emmetropic at any stage of their history. This was borne out also by a careful study of the full refraction tables given.

DR. CHAS. HERMAN THOMAS, of Philadelphia, reported "*Three Cases of Strabismus with Anomalous Diplopia.—An Original and an Acquired Fixation Spot in the Same Eye.*" In the cases here presented attention is directed to the existence of two fixation spots in the deviating eye, one the normal macula used in monocular fixation only, and the other an acquired fixation spot to which reference is made by the patient in binocular fixation only. Two were cases of divergent strabismus; the third was a case of convergent squint; operations were performed in all.

In all these cases when either eye was used alone, the seeing eye was directed centrally, *i. e.*, either eye used alone fixed with the macula. On the other hand, when the two eyes were used in conjunction, the diplopia—if it was then artificially produced or shown to exist—was found to relate to the acquired fixation spot. This was particularly true of the two latter cases. In the first the alternating character of the diplopia showed that the patient could refer to either the macula or to the acquired fixation spot.

A false fixation spot in strabismus is denoted by the occurrence of diplopia contrary to the rule (*i. e.*, crossed diplopia associated with convergent squint and *vice versa*), when prisms corrective of the deviation and of sufficient strength to abolish movement under the cover test, are placed before the patients eyes. It will be seen that practical considerations of importance grow out of a recognition of the presence of two such fixation spots in the same eye and which bear upon the operative treatment of squint.

DR. JOSEPH A. WHITE, of Richmond, Va., read a paper entitled, "*The Practical Value of Low Grade Cylinders in Some Cases of Asthenopia.*"

This article was a protest against the literal acceptance of the editorial statement in the *Journal of the American Medical Association*, February 3, 1894, that low grade cylinders had no practical value in asthenopia, and to support his contention the author submitted a statistical table of a hundred successive cases of asthenopia, the trouble in which was due to the annoyance caused by low grade astigmatism, and which were very much improved or absolutely cured by the use of the cylinders for a longer or shorter period, some temporarily and some permanently. The cases were divided by the writer into six classes as follows:

CLASS A.—Astigmatism with the rule axis  $90^{\circ}$  the two eyes differing in refraction, 8 cases.

CLASS B.—Astigmatism with the rule in one eye with axis at  $90^{\circ}$ ; the other with an inclination of from  $15^{\circ}$  to  $40^{\circ}$  from the vertical meridian, 13 cases, of which two had compound astigmatism.



CLASS C.—Astigmatism with axis inclined from  $15^{\circ}$  to  $30^{\circ}$  from the vertical meridian, 33 cases, 12 of which had compound astigmatism.

CLASS D.—Astigmatism against the rule with axis in horizontal meridian, 20 cases, 5 with compound astigmatism.

CLASS E.—Astigmatism with axis inclined from  $15^{\circ}$  to  $30^{\circ}$  from the horizontal meridian, 18 cases, 2 with compound astigmatism.

CLASS F.—Astigmatism with the rule in one eye, and against the rule in the other eye, 8 cases, 1 with compound astigmatism.

The ages of the cases are as follows:

14	were between	10 and 15	years.
30	"	"	15 and 20 "
40	"	"	20 and 30 "
14	"	"	30 and 40 "
4	"	over	40 "

The cylinders prescribed were in 53 cases  $+0.25$  D. for both eyes; in 18 cases  $+0.25$  D. for one eye, and  $+0.50$  D. for the other; in 19 cases  $+0.50$  D. for both eyes, or  $+0.50$  D. for one eye and  $+0.75$  D. for the other. Twenty-two cases applied for treatment of headache, without being able to trace its causation to the eyes; seventy-eight complained of difficulty of vision, eyeache, etc. Six of these had blepharitis, three chronic conjunctivitis, and four spasm of accommodation.

In all cases every precaution was taken against error. Each case was examined carefully with the ophthalmometer and test lenses; the accommodation was then thoroughly paralyzed, an examination by retinoscopy made and the test lenses used again. Any change from the first record was noted. When the accommodation was re-established, the previous examinations were verified, or, any discrepancies reconciled. The muscles were tested and any radical defects treated by orthopædic exercises or operation. Very few of these cases had any marked muscular errors, and most of these disappeared after the glasses had been worn a while. Careful inquiry into the personal and family history of the case was always made

and any apparent extrinsic cause for the asthenopia recorded. When necessary, treatment for the same was instituted by Dr. White or the family physician, who was invariably informed of the former's opinion and his reasons for it. No glass was ever prescribed unless it improved distant vision. Such cases were seen again in two weeks, if possible; in this series this was done in a large majority of them, and the others were heard from.

From one to three cases in each class were reported in full to show the results obtained. In no case was a quarter or half dioptre cylinder in both eyes prescribed *when both eyes were alike*, or the defect *was according to the rule*, with axis in vertical or horizontal meridian; and the author stated that he had never seen a case benefited by such a glass because this kind of astigmatism was strictly physiological. It was only when the two differed, or the axis deviated from the vertical or horizontal meridian, that in his experience such low grade cylinders proved of practical value.

He based his conclusions on the statements of the patients, and asked that if such testimony from reliable individuals was worthless, if the cure and relief of their headache, asthenopia, etc., was imaginary, and the value of the glasses mythical, what evidence are we to accept in proving the efficacy of any therapeutic measure.

DR. CHARLES A. OLIVER, of Philadelphia, presented a "*Clinical and Microscopical Study of Two Cases of Glaucoma Associated with Intra-Ocular Hæmorrhages.*"

The first case was that of a well-cared for though dissipated man suffering from grave nerve and cardiac disease, who suddenly evidenced a right-sided thrombotic or embolic process in an eye that had been the subject of retinal hæmorrhage and shown signs of increased intra-ocular pressure. Recurrent breakages of the vessel walls of the eye with increasing exacerbations of peri-orbital neuralgia took place. A successful and slowly performed iridectomy with no hæmorrhage, relieved the pressure and pain for two months. An acute attack however necessitated immediate enucleation. Microscopic



sections showed all the evidence of disintegration of tissue, especially at the posterior pole of the eye in the deeper layer of the retina, and in the uveal tract, from the presence of disorganizing blood and lymph material. The second case is given because of great similarity of its clinical history and its contrast in result. Here an apparently healthy middle-aged man without any other evidences of gross organic vascular lesion or general disturbance of the secretory or excretory system, gradually developed during the course of three years' time, a comparatively painful blindness in the left eye with an almost complete annihilation of vision on the more neuralgic side. Brought to necessary operation by an acute exacerbation of pain, the procedure (iridectomy) was safely accomplished upon a degenerate, and fortunately, probably but slightly vascular tissue, from which there was but little hæmorrhage. Relieved for several months' time, another attack with its necessary accompaniment of lowered functional power, only appeared as the result of indiscretion. By a similar uncomplicated operation, again the process was checked, care being taken this time to keep the patient's general regimen, diet, etc., under the strictest surveillance. The eye then being quiet and all visible hæmorrhage having been absorbed, the last hope for useful sight was given to him by the extraction of a cataractous and swollen lens. Safely accomplished, with no accident of any nature, central vision was brought to a higher acuity than during the entire time that he was seen. This degree of visual power has been held in an eye whose tonus is seldom, if ever, above normal: an eye, however, that, too, surely is showing the slow, steady and irregular contraction of the field, as seen in the increasing pathological excavation of simple and chronic glaucoma. The position taken in the paper is that from the teachings of this second case, there can be but little doubt that a few rare examples do exist where the visual function may be usefully prolonged for varying periods of time, thus allowing the formulation of the following conclusion, that in some extremely rare cases of glaucoma that is secondary to slight recurrent attacks of intra-ocular hæmorrhage, especially

in young and comparatively sthenic subjects, in whom the vascular system is not greatly involved, the organ may be kept for much longer periods of time than ordinary, in a condition of usefulness, by appropriate hygiene and therapeutic measures, care being taken to slowly perform proper operative procedures whenever there is urgent necessity to relieve increased intra-ocular pressure, by rendering patulous the most important outlets for the intra-ocular fluids.

DR CHARLES A. OLIVER, of Philadelphia, gave the resumé of "*Some Additional Studies upon the Clinical Value of Repeated Careful Correction of Refractive Error in Plastic Iritis.*"

Ignoring as he then did, any cases where there were objective evidences of corneal opacity, lenticular haze, or even the faintest visible disturbances in the aqueous or vitreous humors, excluding all instances where there were any perceptible tags of adhesion between the iris and the lens, and limiting the work to those eyes where the pupils were seemingly dilated ad maximum, a number of experimental studies were instituted to determine, if possible, the cause of the metropic increase in two ways.

1. To discover whether there is a forward displacement of the lens. This was shown not to occur objectively in two ways. First, by oblique illumination; and second, by study of the catoptric images.
2. To endeavor to determine clinically whether the index of refraction or whether the actual amount of either the aqueous or the vitreous humor is increased during the inflammatory process. This in measure was shown not to be the case, first by careful and repeated study of objective appearance of successive layers of these two media by both oblique illumination and the ophthalmoscope.
3. To make certain that the temporary increase of the index of refraction in the type of cases here under special consideration, is dependent upon either spastic tonicity of the fibers of the ciliary muscle or congestion with rigidity of the ciliary bodies. This was done by first obtaining the exact corrective lens that was necessary to bring a subnormal vision

to normal, care being taken to choose intelligent patients with but slight refractive error. This done, three instillations of two drops each of strong solutions of either atropine, cocaine and atropine, or eserine were made at three minute intervals, and the ametropia immediately re-examined, when in every case in which the inflammatory process had not absolutely subsided, the use of the cycloplegic reduced the apparent amount of the refractive error (ordinarily one-fourth to three-fourths diopter) whilst the myotic in every instance tried, increased the apparent amount of the ametropia. To recontrol these tests, all of the eyes whilst in the condition of surcharged dosage as it were, were re-submitted to a few of the most important of the objective tests, when in every instance where the mydriatic was used, the lenticular reflexes were shown to be more greatly approximated, whilst in those cases where the myotic was employed, the lenticular reflexes become further separated, so that consequently in every instance of this third variety of study not only was so-called "spastic accommodation" proven, but the supposition of the forward displacement of the lens was in great measure denied, and both real and relative increases of aqueous and vitreous humor confuted.

DR. W. H. WILMER, of Washington, D. C., reported a case of "*Melanotic, Giant Celled, Alveolar Myxo-Sarcoma of the Eyelid.*"

On April 24, 1893, a small tumor was removed from the right lower eyelid of a woman about thirty years old. Its duration was six or eight months. The bulk of the tumor was in front of the tarsal cartilage, and the skin and conjunctiva were perfectly normal. It was invested in an extremely tough fibrous capsule. It is now thirteen months since the growth was removed and there has been no return.

The hardened tumor measured 12 mm. in length, 7 mm. in breadth, and  $4\frac{1}{2}$  mm. in thickness. The microscope showed the growth to be a melanotic, giant-celled, alveolar myxosarcoma. The elements of especial interest were the giant cells, pigment in spots, myxomatous tissue and dense capsule.

Accessible literature presents the histories of thirty-five

cases of primary sarcoma of the eyelid. In 12% all four lids were involved. In 16% it was necessary to remove the eye with the tumor. In 16%, all children, death resulted from the disease. In 40% the return of the growth is mentioned; in others the patients were last seen shortly after the operation, and some of the growths reported were themselves recurrent. Forty per cent were spindle-celled, 43% round-celled, 17% mixed, 11% presented myxomatous elements, 20% were melanotic, 14% were encapsulated, 11% were due to traumatism.

DR. I. O. RICHEY read a paper entitled, "*The Halo Symptom in Glaucoma.*"

This paper offered a new explanation of the halo in glaucoma, consistent with the etiology of glaucoma as set forth in his previous papers on the subject, "The Prime Etiological Factor of Glaucoma is Constitutional" (Transactions American Ophthalmological Society, 1892), and "The Disease Process, Glaucoma" (*Amer. Jour. Med. Sci.*, 1893).

Reasoning from the Descartes theory of the encircling lunar halo, accepted by Dr. Thomas Young and Sir Isaac Newton, that it is due to reflection and refraction of light by ice and snow crystals, it claims that the halo of glaucoma is due to the presence of crystals of the urates anterior to the retina and posterior to the iris, probably in the aqueous humor; that the transposition of colors is in accordance with the disposition of rays of light passing through the aperture of a screen, and is strong proof in support of the theory.

"*The Practice Value of the Ophthalmometer.*"

DR. EDWARD JACKSON from a study of the measurements obtained with Javal's ophthalmometer, and subsequently by other methods under full paralysis of accommodation, concluded that the corneal and total astigmatism were identical in about 6% of the usual run of cases of ametropia. The amount of astigmatism alone corresponded in 22% and the direction of the principal meridians in 52% and approximately in 78%. Because of the lack of correspondence between the corneal and total astigmatism, the indications of the instru-

ment cannot be regarded as accurately showing the amount of astigmatism to be corrected by lenses. It must take its place among the approximate tests in the practical working out of ametropia. Among these, the definiteness of its indications and the ease and rapidity with which they may be obtained, give it a high place. As an instrument of scientific precision for purposes of original investigation and as a means of practical determining astigmatism in aphakic eyes, it has a more definite and positive value.

DR. W. E. LAMBERT, of New York.—Mr. President, I merely want to cite a case which came under my observation recently to bear out the remarks of Dr. Jackson in regard to the action or inaction of the ophthalmometer; the erratic way in which it seems to perform and the amount of astigmatism shown by it and other methods. This lady of whom I speak had according to Javal, three diopters in the right and in the left one and one-half diopters less with the rule, but she showed one-half diopter in both eyes. The subjective method confirmed this and with this correction the patient's vision was brought up to a proper standard. In each eye there was one and one-half diopters of astigmatism. The peculiar thing was that it should have been apparently corrected by diverting one eye one and one-half diopters. This difference I frequently find by Javal. In my experience a larger number of cases than Dr. Jackson's have varied so much that I have ceased to place any great reliance upon it. On the other hand, Dr. Jackson also mentions that he had found the shadow test very reliable. My own experience has been very satisfactory with this method. I have gotten so that nine cases out of ten, even without the mydriatic are best suited with glasses which I find by the shadow test. Those glasses found by that method I prescribe with perfect satisfaction and without further tests.

DR. SAMUEL D. RISLEY, of Philadelphia.—Mr. President, Before the close of the discussion, I desire to refer to one matter suggested in one of the papers—I think by Dr. Ring—that the astigmatism of one-seventh was found after these tenotomies. I suppose that an increase of astigmatism often occurs after tenotomy of the lateral muscles. I have seen that in

cases of strabismus and I have demonstrated it a few times with the ophthalmoscope. So letting up the pressure, so to speak, of these lateral muscles by tenotomy seems to determine some increase in the lateral curvature. I have seen astigmatism of one-half diopter proved by the ophthalmoscope and by subjective demonstrations by the mydriatic increase in one eye from one-half to one and one-half diopters and in another more so. I think that should be looked to after tenotomy.

I should also very much like to discuss, if time permits the statements made in some of the papers regarding anomalous muscle balance. I would like simply the privilege of alluding to a few things here, with the further privilege of writing down later a little more in extense for the transactions. I want to say that in my belief it is one of the errors into which some of us have fallen, this misconception of what is a normal eye. It has seemed to me that the perfect eye of binocular vision is the emmetropic eye with a normal innervation and a normal form of the orbit. Any departure from this is very sure to set up conditions which lead to asthenopia and when we study the frequent anomalies which must determine the form of the orbit in which the eyeball is developed, we must anticipate a priori that there should be normal departures in the eyeball itself. Mathematically considered—taking into consideration the physiological difference between the innervation and the other conditions—mathematically considered in no pair of eyes which depart from the model emmetropic eye, we must either have dim or double sight and it is only because nature had concerted so in those eyes that it enables us to overcome anomalies and departures from the normal standard. Donders long ago pointed out—as long ago as 1846 or 1848—long before the publication of his classical treatise—that there was a very marked difference in the relative range or region of divergence, which he developed so beautifully in his subsequent treatise and where there is a hypermetropic person for example or commencing presbyopia, there must be a disturbance of this normal relation. In the hypermetropic eye the individual has all his life long been learning to accommodate without converging, and has, therefore, required a region through which



he can do this successfully and comfortably. When he reaches the point of commencing presbyopia, which in his case will depend upon the degree of his refraction error, in the interests of his vision, we must help him with a convex glass. We at once disturb the relation he has acquired and we therefore find these cases of exophoria. He must learn to unlearn what experience has taught him all his life. We compromise this with him in the work he has done for so many years. Among persons who give manifestation in the presence of hypermetropia are gradually taught by successively stronger convex glasses to acquire a new range of convergence and accommodation. [This is the uncorrected report —ED.]

The President announced that Dr. W. Dennett, of New York, would exhibit and explain the model of an instrument for determination of prisms.

DR. W. S. DENNETT, of New York showed "*New Mires for Use on the Javal Instrument*," and said: These are the result of an attempt to increase the delicacy of the instrument by the use of a vernier, the two parts of the vernier being put on the upper and lower halves respectively of the mires in common use; the rest of the mire being black. The scales are black lines on white ground. The resulting reflection in the cornea is a vernier such as is used on most instruments of precision. The principal divisions mark diopters but the vernier reads tenth diopters. This is very near the limit of possibility for instruments of as low magnifying power as that in common use.

A new lantern is here shown similar to that described in the current number of the "New York Eye and Ear Infirmary Reports, also one with four lamps. The two extra lamps are for the instruments having the large discs with degrees numbered on the edge to be read by reflection from the cornea. This large disc which is now so common is a clumsy and useless encumbrance to an otherwise elegant instrument. One of half the size is quite as good for every day use, and much more convenient.

The Wollaston Prism, by which the doubling is often produced, gives two symmetrical images, each having a greenish

fringe on the side toward the other, consequently there is no point of precise contact except with monochromatic light, and this is not conveniently obtained.

By using a green background for the mire, the eye is somewhat paralyzed to this color and the adjustment is more precise, but the accuracy with which the estimated center of two vernier lines can be made to coincide is greater and is very little affected by dispersion. The vernier here shown is too fine for easy reading on this instrument, but one reading quarters and estimating eighths would no doubt compare favorably with those in common use.

The President announced that Dr. W. E. Lambert, of New York, would exhibit and explain the use of a Refractometer for Retinoscopy.

DR. W. E. LAMBERT, said: This instrument which I now present to the Society is intended to be used in estimating errors of refraction by skiascopy.

It consist of two superimposed discs, one of which contains 9 convex lenses ranging from +1 D. to +9 D. and 10 concave lenses from -1 D. to -10 D.; the other disc contains .25, .50, .75 and 10 D. convex and concave.

By means of a gear movement operated by a tube and rod, the latter working within the former, both disce can be revolved either independently or together with one hand, thus enabling the examiner to rapidly bring the various lenses in front of the eye piece without changing his position during the examination. This is the special advantage of the instrument and removes the great objection to skiascopy.

On the reverse side of the instrument is an arm carrying the eye piece, which arm can be swung to either side of disc, thus adapting eye piece to right or left eye. The arm supports in front a graduated cell, in which a cylindrical lens can be placed at any desired axis, or a slide containing six cylindrical lenses of different foci, which are varied by raising or lowering the slide while the desired axis is obtained by rotating the celi and and is indicated by a pointer on the scale.

In using the instrument in cases of astigmatism, first estimate the refraction of the two principal meridians employing

only the spherical lenses; then placing the cylinder thus indicated in the cell at the proper axis, repeat the test to insure accuracy. The advantage of using a slide with several cylinders is that the strength of some can be easily increased or diminished should the first estimate of the astigmatism be incorrect.

DR. B. ALEXANDER RANDALL, of Philadelphia.—Mr. President, I would like to say a word with regard to retinoscopy with the plain mirror, not from one meter but from three or four. It is unquestionable better for many reasons. It is more delicate and I can positively assert that for a large proportion of instances it can clearly show differences of one-fourth or even one-tenth diopters. In favorable cases I can easily distinguish between .65 and .75, can even discern that anomaly between these two. It does seem to me that retinoscopy with a plain mirror, from three or four or even six meters is a method which ought to have more trial than it has received. If the source of light is ample, and the plain mirror used has a sufficient sight hole, it is perfectly possible to see the movements of the shadows at the longer distance so as to be cognizant of everything, and to get the increased accuracy. It is a mistake to use this which is a crucial test when you want to do your coarse focussing, but for a fine focussing arrangement there is nothing approaching this method in satisfaction.

DR. W. E. LAMBERT, of New York.—Is that practical with a small pupil?

DR. RANDALL.—It is with a pupil of three millimeters. In unfavorable cases or conditions one may however be forced up to the nearer test distance.

DR. W. E. LAMBERT, of New York.—I merely want to say a word in reply to Dr. Randall's remark. It is not my practice to use this instrument at three or four meters. It is a mistake that the instrument which I have here exhibited was not made longer. I notice the books speak of one meter as being the proper distance. It has been my practice for some time back to get off as far as I could with a plain mirror.

DR. SWAN M. BURNETT of Washington.—Mr. President, I

do not now know how many years ago it is since I showed the first instrument of the kind described in this very room. It was not so complicated as this but I have used it with perfect satisfaction for six or seven years. Since that time I think that the complications connected with this one are rather against its success. If, as Dr. Randall says, for the more accurate results you must get off at a greater distance than one meter and have a number of glasses in front, I think the rod no advantage.

I cannot agree with Dr. Randall as to what he calls retinoscopy, but which is not retinoscopy at all. The gentlemen present need not be alarmed. It is our usual fight over this proposition.

Undoubtedly you can tell the difference in the reversal movement very well, even for a quarter diopter or less in many cases, but there are very many others in which that does not give you the correct refraction. I called the attention of the Society three years ago to what I have called the internal shadow phenomena in which the findings cannot be relied upon. The refractive media must be clear and uniform before you can get a movement that gives the exact refraction of the eye. To claim that you can get within one-fourth or even one-half diopter of the exact refraction is, I think, as much of a mistake as to say, we can get the total astigmatism with the ophthalmometer. We must not claim that for skiascopy any more than we claim it for the ophthalmometer.

DR. C. F. GLARK, of Columbus, Ohio, read the next paper entitled, "*A Case of Binocular Coloboma of the Lens Without Coloboma of the Iris or Choroid and with Vision Retained.*"

DR. ALBERT C. HEYL, of Philadelphia, Pa.—I would like to refer to two points in connection with this subject. One is, that clinically we must distinguish between two varieties of congenital defects of the crystalline lens which probably belong to the same classification. In the one the lens is symmetrical in shape but small in size. That is not true coloboma of the lens as ordinarily described. The second is that in which there is a lack of symmetry in the lens as mentioned in Dr. Clark's case. This is coloboma lentis. The other point I

desire to raise is with reference to pathology. I would like to state Becker's view with reference to this matter as his work on the pathology of the lens is not very accessible. He does not believe in the formation of cells as described by von Becker's *Archiv. f. Ophth.*, 13, ix. He believes the cases of coloboma lentis are due to the imperfect development of the zonula, or possibly its absence at a given point. Thus it happens in the process of development that the lens is pulled out of shape. I think that is, perhaps, the latest view advanced in connection with the subject. It has certain difficulties connected with it which cannot now be discussed in detail.

DR. C. F. CLARK, of Columbus, Ohio.—Mr. President, there are two cases reported—I think they are Dr. Sissel's—in which the suspensory ligament was detected. One was a case which occurred in Fuch's clinic.

DR. ALBERT C. HEYL, of Philadelphia, Pa.—It has long been known that the vessels of the brain tissue are inclosed in tubular sheaths so that the vessels lie in a certain amount of lymph. In 1865 His detected these peri-vascular spaces in the retina and later Schwalbe was enabled to inject these spaces about the retinal veins and capillaries. I might give here a description of a rupture of the lymph sheath of a retinal vein which occurred and allowed the latter to protrude through into the vitreous. The case was that of a woman who eighteen months before had suffered defective sight after pregnancy. Albuminuria had occurred and when she presented herself to me the vision was very defective, the media were clear and a few signs such as we see in albuminuric retinitis were present. Two months ago the patient came again with the statement that on several occasions vision had been very much obscured, but had cleared up but two weeks before coming, had become obscured again, and had remained so. In the left eye there was a floating mass in the vitreous, directly back of the lens, completely obscuring the fundus and in the other eye the appearances which I now demonstrate. I have here a small drawing and on a larger one I will demonstrate to the Society the same thing. You notice in the first place this white object in front here (indicating). The refraction of the disc was ametropic. The re-

fraction of this white object was 4.5 D.; it was a connective tissue growth in the vitreous. Apparently it is made up of two portions. This portion is flat and parallel to the corneal basis. At the last observation this portion had largely disappeared so that evidently it was one long extended membranous object in the vitreous, simply folded on itself at an angle. Here is the vein that runs up normally into the upper inner retinal quadrant. It makes at this point a bend and a loop and the refraction of the apex of this loop was about 4.5 D. so that the loop stood out in the vitreous. Then it made a turn and came down to the retina and ran along a certain distance, then made another loop into the vitreous again, the refraction of this loop being 3.5 D., a little less than the other. Then it made a sinuous curve in the retina. You see between these little loops in the retina white objects about the caliber of a retinal vessel. That, no doubt, was the original track of this vessel. Under certain conditions, a rupture of the lymph sheath had occurred and these vessel loops had been forced out into the vitreous. I have seen two or three times in the course of my experience conditions resembling that, where the vessel has been in the retina and a white object resembling a retinal vessel was apparent, but I have never been able to explain it. But the fact that these loops had extended into the vitreous explains the whole thing. This should have been the original length of the vessel but under the influence of strong intra-venous tension the vessel had been forced through the vessel sheath leaving the remnant in the retina. This remnant lost its clearness and transparency and became white. Two remarks with reference to this rare phenomenon. One is, that the cause of this condition is no doubt the strong intra-venous tension in a vessel, causing it to be forced through the vessel-sheath, and in addition to that for that alone could not have induced it, that the sheath must have been diseased, because we often see tortuosities in retinal vessels sufficient to form loops without producing conditions of this kind. The sheath, therefore, must have been in a more or less diseased condition. The other thing is the association of this connective tissue growth which is a very rare thing with this lesion. I do not



think that this was a coincidence simply; I believe that there must have been some cause in addition to this. I think it was Hermann Pagenstecher who first declared the idea that connective tissue formations in the vitreous were not developed from the stroma but from leucocytes which were developed into connective tissue. I recall an experiment of Schwalbe in which he found portions of vitreous introduced into the lymph sac of a frog's back had been found after a time densely infiltrated with leucocytes from the lymph. I think that these loops of vessels, being forcibly projected into the vitreous, had opened a pathway for the ingress of leucocytes, that those had streamed toward the optic disc, and these leucocytes have developed into the formation of this connective tissue growth. Twenty years ago a similar tissue growth was represented before the Society by Dr. Strawbridge. A picture of this may be found in the reports of that period.

The next paper announced was "*Colloid Disease in the Macular Region, Analogous in Appearance to the So-called 'Drusen' in the Nerve Head.*" (No abstract).

DR. CHARLES W. KOLLOCK, of Charleston, S. C., read the next paper entitled, "*Atrophy of the Optic Nerve.*" (No abstract).

DR. LUCIEN HOWE, of Buffalo, N. Y., read the next paper entitled, "*Three cases of Ectropia Uvae.*" (No abstract).

The next paper announced was "*Exhibition of Water Color Sketch of a case of Embolism of the Central Artery of Retina,*" occurring in practice of Dr. Harlan. (No abstract).

The next paper announced was "*Diplopia Produced by Fall on the Head,*" by Dr. Kollock.

DR. H. KNAPP, of New York.—Mr. President, did the paralysis appear to be oblique?

DR. KOLLOCK.—My report is imperfect for being away from home I did not have time to test the case as accurately as I could have done. I should also have examined the other muscles.

DR. P. A. CALLAN, of New York, read the next paper by title, "*A Double case of Neuro-Paralytic Keratitis Lasting Ten Years.*" (No abstract).

DR. J. A. LIPPENCOTT, of Pittsburgh, Pa., read the next paper entitled, "*Entropion, Probably Congenital, Complicated with Ulcers of Cornea, with Operation; Recovery.*" (No abstract).

DR. F. M. WILSON exhibited a "Portable Perimeter."

DR. C. A. OLIVER, of Philadelphia, exhibited an "Artificial Eye;" also a "Special Sterilizer."

Adjourned.

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## SELECTIONS.

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### A CASE OF QUININE AMAUROSIS, WITH REMARKS.<sup>1</sup>

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BY JOHN HERBERT CLAIBORNE, M.D.,

Adjunct Professor of Ophthalmology in the New York Polynlinic.

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On December 16, 1891, I saw Mr. W. A. C. for the first time. He said he was totally blind and had been so for a week. The case was first seen by my father, Dr. J. H. Claiborne, Sr., of Petersburg, Va., who sent me the following note:

"I was called to see Mr. C. on December 8, at 8 A.M. Found him in bed, semi-comatose, aroused with difficulty; would only say 'give me water,' and relapse into same condition. Pulse 100°, full and slow. Respiration slow. Skin moist and warm. Pupils dilated the to utmost and not at all responsive to light. No resistance or evidence of sensibility on pulling the lids apart. No history of the case obtainable, except that he retired the night before in usual health. I prescribed a placebo. During the day I got a specimen of urine. I found some albumin and one cast. Nothing to justify the gravity of the symptoms. On December 9, he could be aroused more easily. Evidently the deafness was growing better, but no intelligent reply to inquiries and no improvement in the eyes. He became restless and unruly during the day and had to be put under restraint. I gave a few doses of morphine, bromide of potassium, and cannabis indica. He

<sup>1</sup>Read before the New York County Medical Association, April 16, 1894.

soon became more quiet, slept the night through and awakened in the morning with hearing and intelligence restored, but totally blind. I suspected some effusion at the base of the brain and put him on corrosive sublimate and tincture of cinchona, and advised him to see a specialist."

I therefore saw Mr. C. eight days after he was taken ill. For about two months and a half he had felt badly in York. He then went to Richmond, Va., where he remained a week. During his stay he took on an average fifteen or twenty grains of quinine a day. This relieved him temporarily, but after he removed to Petersburg his trouble returned and he worked hard for several days opening his stock in a damp shop. He had been sleeping badly the entire time, and finally made up his mind to rest well one night. With this in view he poured the palm of his hand nearly full of two-grain pills of quinine and took them at once before leaving the store. He went home and got to bed early; after that, he remembered nothing till he awoke several days afterward perfectly blind.

When I saw Mr. C. for the first time I found him with absolutely no light-perception in either eye, either for daylight or for the strong focus of a biconvex lens. He complained, however, of seeing many-colored figures that would change their hue. The sensation of red prevailed. The pupils were fixed and moderately dilated, somewhat irregularly, indeed, the larger axis of the pupils being horizontal. The optic discs of the two eyes were pearl white and the vessels much smaller than in health, although not so small as they subsequently became. The eyes occupied the position of divergence, and the patient had the typical stare of amaurosis. The sclera seemed unnaturally white, so that the patient presented a very uncanny appearance. I diagnosed quinine amaurosis immediately and put him upon potassium iodide in saturated solution. I explained the nature of the case to him and gave a guarded prognosis. He insisted on keeping up some form of treatment although I told him that nothing would assist Nature in restoring vision.

I increased the dose up to fifty grains three times a day until

December 21, when he exhibited a genuine case of double iritis plastica, slight in intensity, however. The pupils were now somewhat irregular and contracted. The iritis slowly improved; by December 31 the inflammation of the iris was entirely gone and the pupils were then moderately widely dilated by the atropine that had been used. On this date the patient said he could recognize the plates and cups at breakfast by a circle of light.

On December 28, I placed him again upon the bichloride of mercury and tincture of cinchona. He laid stress upon the fact that he could see things only by reflected light. Any intense light seemed to blind him completely. He could see a chair in my office when the light was diminished, but could not make it out when the full daylight was allowed to enter. He saw even better by reflected gaslight than by reflected daylight. He could pick up a piece of paper more readily by gaslight than by daylight. He improved so far as to see dimly objects even in another room, and one day when the sky was overcast he said he had read the signs in the street from the car window in coming to my office. During this entire time, although he possessed this much vision for reflected objects, he could not perceive the light of an Argand burner when focused entirely into the pupil.

At the end of three months, without further improvement, he removed to the Massachusetts coast. During his stay there—several months—he contracted “pink eye,” from which he recovered without further distress.

I saw Mr. C. twelve months after his first appearance in my office. His vision then consisted in the ability to occasionally see dim objects at a distance. He had no vision that was serviceable to him for employment. The optic nerves were then dead-white, and the blood-vessels in the two discs had become mere threads that could scarcely be traced after leaving the disc—in fact, a typical picture of quinine atrophy in in the most advanced degree.

It is worthy of note that under the treatment of bichloride and cinchona he fattened so much that he could hardly get

into his clothes. His appetite was enormous at the same time. Vision was about the same.

Dr. Knapp saw the patient in consultation on December 23, 1893, and concurred with me in the diagnosis of quinine amaurosis.

I myself have not seen the patient in twelve months. At his last visit to my office I found his condition the same as formerly. He could see indistinctly striking objects by diffused light, but not when looking directly at them. His peripheral vision seemed to be better than the central, and even that appeared to be fickle.

Dr. Knapp saw the patient on October 12, 1893, and kindly permits me to transcribe his notes.

"In the right eye he saw movements of the hand at six feet. With a candle the field of vision was elliptical. It was limited by five degrees beyond the fixation point upward and toward the nose, and extended as far as twenty degrees downward and toward the temple, producing an elliptical field. The vessels were very small.

"In the left eye he had perception of light; could recognize a candle at twenty feet. Vessels were almost obliterated; pupils irresponsive."

The deafness that accompanies quinine amaurosis had evidently disappeared when I saw Mr. C., he did not complain of any, and certainly heard ordinary conversation with ease. I found both membrane tympani slightly drawn in and a trifle pale. Dr. Knapp found at the first examination that he could hear a watch in each ear at half an inch. There was no tinnitus when I saw him, nor was any observed by Dr. Knapp. There was some improvement in hearing after inflation. It is entirely consistent with the history of such cases that the deafness and tinnitus disappear.

The amount of quinine that may produce amaurosis is distinctly indeterminate, and doubtless, as Atkinson (*Journal of the American Medical Association*, September 28, 1889) says, depends largely on idiosyncrasy. H. C. Wood (quoted by Atkinson) saw temporary blindness result from a dose of twelve

grains. As much as an ounce has been given with the result of temporary blindness and stupor followed by recovery (Tausig, *Medical Times*, April 26, 1864, quoted by Atkinson). Barlow (quoted by Atkinson) narrates a case of a lady with "severe congestive fever, who took forty grains of sulphate of quinine every two hours for ten doses," making four hundred grains. There was no injurious effect from the quinine, and she made a good recovery from the fever. Dr. Emile T. Sabal, of Jacksonville, Fla., narrated to me a case in which twenty grains of the sulphate administered to a young lady produced temporary total blindness. I myself have known a negro woman with tertian ague to take sixty grains at once by mistake and suffer no inconvenience of sight and hearing. There was not even any tinnitus in this case. It would be natural to suppose that physicians who live in the Southern States of our country would see many cases of quinine amaurosis. There is reason to suppose it is rarely seen here. Dr. Sabal, referred to above, has only seen one case in an experience of thirty years in Florida. My father, Dr. Claiborne, in an experience of forty years in tide-water Virginia, has seen only one case—the one reported herewith. It will be observed that the patient was not a native of the section, but was from New York. It is not improbable that a tolerance for quinine is established by a long sojourn in malarial regions. I believe the opposite also to be probable, that one born and raised in a malarial country may lose his tolerance for quinine by sojourn in a colder country.

In 1881 Dr. Emil Gruening (*Archives of Ophthalmology*, B. x., p. 81), compiled thirteen cases of quinine amaurosis, the first being that of Giacomini, quoted by Binz. Since that time the literature has been swelled considerably. Atkinson, in the *Journal of the American Medical Association*, quoted above, recapitulates the histories of forty-nine cases and follows with a masterly review of them. Dr. Alice Wakefield, in the *N. Y. Polyclinic*, August, 1893, recites a case of quinine amaurosis, in which reference is made to Atkinson's compilation. She states that as many as fifty-five cases have been reported. Fischl, in the *Medical News*, July 29, 1893, adds a case. This, together



with Dr. Wakefield's and mine, make fifty-eight. There are probably more.

The symptoms and signs of quinine amaurosis are marked and fairly constant. They are blindness, total or incomplete, which usually comes on suddenly; a dead, pearl-like pallor of the optic nerve, strikingly simulating the pallor of atrophy, accompanied by greatly contracted retinal vessels, both arteries and veins, with occasionally total disappearance of an artery or a vein; concentric or elliptical contraction (Knapp) of the field of vision. The long axis of the field is usually horizontal or slightly downward or outward. Dilatation of the pupils, which are irresponsive to light; partial color blindness in the field of vision. The color sense usually returns entirely. In my case there was distinct divergence of the visual lines. This was also observed by Diez, Browne, and Knapp. Roosa remarked nystagmus in a case of his; Knapp also. Dickinson found congestion of the retinal and choroidal vessels and a distinct tumefaction of the disc. I found the edges of the optic disc in one eye slightly hazy.

In a communication presented to the College of Physicians and Surgeons, Philadelphia, November, 1890, Dr. G. E. de Schweinitz gave the results of some experiments made on dogs for the purpose of determining the lesion in quinine blindness. This was followed by a paper in 1891 in the "American Ophthalmological Society Transactions." Similar work in this direction has been done by H. Bruner, "Ueber Chinin-Amaurosis," Zuerich, 1882. An extract of this work may be found in Nagel's *Jahresbericht*. (I am indebted to Dr. de Schweinitz for this reference). Bruner's work and de Schweinitz, are quite similar, but the latter's is more exhaustive and in reality furnishes all the light we have upon the lesion in quinine amaurosis.

De Schweinitz gave quinine hypodermically to dogs in quantities of from one to four grains to the pound, with the result of producing blindness in from three to fourteen hours. The effect of the drug was obtained more readily by administering the bimuriate of quinine with the carbamide of urea. The symptoms of vomiting, staggering, and convulsions at-

tended the blindness, with two exceptions—in these there were no symptoms attending the blindness.

The ophthalmoscopic picture was similar in every case to that in the human subject. The pupils in all cases were immovably dilated. In one case there was thrombosis of the central vein. Examination with the microscope showed that toxic doses of quinine could produce thrombosis of the central vein, and that neither neuritis nor atrophy, in the true sense of the word, was present in the animal longest blind (nearly a month), but that there appeared to be a species of œdema between the optic nerve and chiasm.

De Schweinitz then undertook additional experiments to settle four points:

1. Whether blindness could be produced in dogs by other salts than those used
2. Whether the prolongation of quinine amaurosis would produce true atrophy.
3. Whether the production of thrombosis or embolism is to be expected in severe cases.
4. Whether the apparent degeneration of the cells of the cuneus found in the first experiments was the result of the hardening process or due to true lesion from the drug.

His subsequent experiments showed that blindness could be produced effectively by other salts of quinine, dissolved with the aid of tartaric acid or dilute hydrochloric acid.

In regard to the second proposition, he proved by microscopic examination that prolonged quinine blindness caused a true atrophy of the optic nerve, chiasm, and tracts.

In regard to the third proposition it was shown that thrombosis of the central vessels may be expected in severe cases.

He found, however, that the degeneration of the cells of the cuneus was due to the hardening process and not to the drug.

Let it be remembered that in the case I herewith report there was no thrombosis of any of the vessels, although the ultimate result shows the case to be the most severe on record.

From the study of this subject the following conclusions may be drawn:

1. Quinine in toxic doses may produce blindness.
2. The toxic dose is distinctly indeterminate.
3. The duration of the amaurosis varies largely.
4. The field of vision remains contracted.
5. Central vision usually returns to the normal.
6. There is color blindness at first; the color perception is ultimately within the central field.
7. The ophthalmoscopic picture is that of white atrophy.
8. Experiments on dogs show that there is atrophy of the entire optic tract.
9. The same experiments show that the cells of the cuneus are probably not affected.
10. Treatment is of no avail.—*N. Y. Medical Journal*.

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### THE TREATMENT OF PTERYGIA WITH THE GALVANO-CAUTERY.<sup>1</sup>

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BY ARTHUR G. HOBBS, M.D., ATLANTA, GA.

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I shall not presume that it is necessary in describing this method of operating on pterygia to even enumerate the many already in vogue. I should rather ask your forbearance for merely suggesting to you that yet another method is to be added to the list already, perhaps, too long; still it may be true that each of these operations has served its purpose in turn in the process of evolution. Since it is the cardinal point in making a pterygium operation to prevent two raw surfaces from remaining in apposition after the operation, which necessarily results in the relapses which we too frequently use, why not then convert each of the raw surfaces into an eschar at once to avoid such failures, provided we are able to demonstrate practically that this means will bring about that desired result?

<sup>1</sup>Read before the Georgia Medical Association, April, 1894.

For some years the galvano-cautery point has been resorted to in corneal ulcers, particularly in those indolent and intractable ulcers which have refused to yield to other methods of treatment. It was suggested to me a few years ago, after seeing some of the beautiful results of the cautery when applied to ulcers of the cornea, that it could, at least, produce no bad results if properly applied to the neck of a pterygium for the purpose of cutting off the nutrition of its corneal apex. I hoped that it would prove a better means of severing the arterial supply to the apex as it crossed the sclero-corneal junction. This object is generally attained by the use of the knife, and various methods have been resorted to to accomplish the purpose. The failures in pterygium operations are usually due to the resulting re-establishment of the arterial circulation, and when this occurs the desired end of the operation fails in proportion to the number of the re established vessels. The great vascularity of a pterygium, with its vessels crossing over the sclero-corneal line to supply its apex on the cornea, renders it difficult to permanently sever all the arteries by a clean cut with the knife; hence, perhaps, a score of different methods of knife and scissor operations have been resorted to by different operators to accomplish this end.

Each operator aims at one end primarily, and that is to completely cut off all the blood supply from the corneal apex. Secondly, his desire is to destroy as little conjunctiva as possible. When the first end is attained the corneal part of the pterygium has lost its direct nutrition and can then only share with the cornea proper for its sustenance, which is indirect, or by imbibition. As this meager supply proves insufficient atrophy results, and the partial, or almost complete, obliteration after a time will depend upon the activity of the absorbents. For this reason the best results are obtained in younger subjects in which, as a rule, the lymphatics are more active, as is also the contractility of the arterial coats.

In many cases when the knife is resorted to a secondary pterygium results, in which sufficient nutrition is re-established to the apex to perpetuate the corneal haziness and to allow it

even beyond its apparent margin to greatly interfere with vision. When the cautery section is well made I have not seen these secondary results that are often so difficult to prevent by a clean cut with the knife or scissors. In some cases, however, it may be best to combine the methods of operating, as I have done in two cases not included in this report. These two pterygia were extremely vascular; hence I first used the knife in the usual way, and then seared the divided edges with the cautery blade to prevent the secondary results.

The fine pointed cautery blade, heated with a battery that can be perfectly gauged and always relied on, is applied horizontally to the narrowest portion of the growth, which is near the sclero-corneal line; the touch is made at the moment white heat is reached and should be almost instantaneous and re-applied as quickly, if the tissues are not at first completely severed. If the growth is not adherent to the sclera and corneal margin, it is best to grasp it with small forceps and slightly raise it from the sclera. When the forceps are used it is easier to be certain that the cautery has made a complete section of all the hypertrophied and over-vascular conjunctival tissue.

When the corneal head is large and protruding, it is advisable to make a cautery application in the same manner as in applying it to a corneal ulcer. In both cases the resulting cicatrix is less—it is more transparent. This is not altogether an unknown fact, but one that has seemed never to have been brought out as prominently as its importance would suggest. For this reason one may be tempted often to resort to the cautery to reduce a large pterygium apex or a corneal ulcer, for the purpose alone of attaining this corneal transparency. The resulting eschar so completely severs the vascular connection, leaving no raw surfaces in apposition, that a re-established circulation is practically impossible; this cannot be said when the knife or scissors have been used. In case the redundancy of tissue at the point of section should seem to require reduction, the scleral end of the section may be turned under and a transverse suture introduced.

I have made this operation fourteen times, and would have

made it half as many more times during the last two years, but for that decided objection to the cautery which we so often meet with and are bound to respect. This operation is more quickly performed; it is followed by no bleeding; it leaves no ecchymosis; the wound heals more rapidly; there is less pain during and after its performance; it requires no bandages and the corneal haziness around the apex is less.

A weak solution of cocaine, about a two per cent, is first dropped into the conjunctival sac, then after about five minutes a stronger solution, about a ten per cent., is applied at intervals, locally, by means of a small cotton probe, for five minutes more; in the meantime the lids are held open. By this means the toxic effects are avoided except in those subjects that are unusually susceptible to cocaine. In using cocaine in this latter strength, I try to avoid as much as possible, by the position of the patient, its contact with the cornea. It is now a well-known fact that when used in this strength, or even when much weaker, that this drug is disastrous to an abraded cornea, if long continued.

The kind of galvano-cautery apparatus, the ease of its manipulation, the size of its blade, the confidence of the hand that presses the button, the requisite degree of heat, which should be gauged by the turn of the screw, are some of the necessary factors in this seemingly simple, yet delicate, little operation, whether it be made to a corneal ulcer or to the neck of a pterygium. The only galvano-cautery apparatus in my knowledge that I would now be willing to trust for these purposes is the "Transformer" of the alternating current of fifty-two volts.

I am now using, in my consultation rooms, the first two of these little instruments made. I described the various uses and advantages of this "Transformer" in a paper read before the Pan-American Congress last fall. So far as I know, the galvano-cautery has not hitherto been used as a means of cutting off the corneal apex of pterygium.—*Atlantic Medical and Surgical Journal*.